

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application;

--1. (Currently Amended) An encoding apparatus that encodes[[,]] for compression[[,]] a multi-channel signal including digital signals from a plurality of channels by framing the multi-channel signal, determining [[the]] a number of steps of quantizing data in the frame, and ~~making~~ performing entropy coding of the digital signals, the apparatus comprising:

[[a]] provisional-number-of-in-use-bits calculating means for calculating a sum of code length in a current frame as a provisional number of in-use bits for each channel by making entropy coding of the digital signals based on ~~the basis of the~~ a provisional number of quantizing steps provisionally determined for quantizing the digital signals;

[[an]] inter-channel bit allocation means for allocating [[the]] a number of bits usable for each channel based on ~~the basis of~~ a ratio of the provisional number of in-use bits for each channel with [[the]] a total provisional number of in-use bits, which is [[the]] a sum of the provisional numbers of the in-use bits for all the plurality of channels, and

[[a]] number-of-bits adjusting means for adjusting the number of in-use bits based on ~~on the basis of~~ the number of usable bits allocated to each channel.

--2. (Currently Amended) The encoding apparatus as set forth in claim 1, wherein:

the ~~multi-channel~~ plurality of channels includes a plurality of group channels each including two or more channels;

the provisional-number-of-in-use-bits calculating means calculates the provisional number of in-use bits in the each group channel; and

the inter-channel bit allocation means allocates the number of bits usable for each group channel based on ~~the basis~~ of a ratio of the provisional number of in-use bits for each group channel with the total provisional number of in-use bits, which is ~~[[the]]~~ a sum of the provisional numbers of in-use bits for each group channel.

--3. (Currently Amended) The encoding apparatus as set forth in claim 1, wherein the provisional-number-of-in-use-bits calculating means transforms a ~~time-axial~~ time-axis signal into a ~~frequency-axial one and then~~ frequency-axis signal, quantizes the ~~frequency-axial~~ frequency-axis signal, and ~~makes~~ performs entropy coding of the quantized signal.

--4. (Currently Amended) The encoding apparatus as set forth in claim 1, wherein the provisional-number-of-in-use-bits calculating means divides data in the current frame into units

of coding and determines the provisional number of quantizing steps based on ~~the basis of~~ a scale factor for normalization of the data included in the units of coding.

--5. (Currently Amended) The encoding apparatus as set forth in claim 1, wherein the inter-channel bit allocation means allocates a part of ~~[[the]]~~ a total number of allocable bits as the number of usable bits corresponding to the ratio of the provisional number of in-use bits for each channel with the total provisional number of in-use bits for all the channels.

--6. (Original) The encoding apparatus as set forth in claim 5, wherein the inter-channel bit allocation means allocates other than the part of the total number of allocable bits evenly for each channel.

--7. (Original) The encoding apparatus as set forth in claim 5, wherein the inter-channel bit allocation means makes a proportional allocation of other than the part of the total number of allocable bits for each channel correspondingly to a code length in which each digital signal is encoded without being compressed.

--8. (Currently Amended) The encoding apparatus as set forth in claim 1, wherein the digital ~~signal is a~~ signals are

digital audio ~~signal~~ signals.

--9. (Currently Amended) An encoding method of encoding[[,]] for compression[[,]] a multi-channel signal including digital signals from a plurality of channels by framing the multi-channel signal, determining [[the]] a number of steps of quantizing data in the frame, and ~~making~~ performing entropy coding of the digital signals, the method comprising the steps of:

calculating a sum of code length in a current frame as a provisional number of in-use bits for each channel of the plurality of channels by ~~making~~ performing entropy coding of the digital signals based on ~~the basis of the~~ a provisional number of quantizing steps provisionally determined for quantizing the digital signals;

allocating [[the]] a number of bits usable for each channel based on ~~the basis of~~ a ratio of the provisional number of in-use bits for each channel with [[the]] a total provisional number of in-use bits, which is [[the]] a sum of the provisional numbers of in-use bits for all the plurality of channels, and

adjusting the number of in-use bits based on ~~the basis of~~ the number of usable bits allocated to each channel.

--10. (Currently Amended) The encoding method as set forth

in claim 9, wherein:

the ~~multi-channel~~ plurality of channels includes a plurality of group channels each including two or more channels;

the provisional number of in-use bits in ~~[[the]]~~ each group channel is calculated in the provisional-number-of-in-use-bits calculating step; and

the number of bits usable for each group channel based on ~~the basis of~~ a ratio of the provisional number of in-use bits for each group channel with the total provisional number of in-use bits, which is ~~[[the]]~~ a sum of the provisional numbers of in-use bits for each group channel, is allocated in the inter-channel bit allocation step.

--11. (Currently Amended) The encoding method as set forth in claim 9, wherein in the provisional-number-of-in-use-bits calculating step, ~~there is transformed a time-axial~~ time-axis signal is transformed into a ~~frequency-axial one and then~~ quantizes frequency-axis signal, the ~~frequency-axial~~ frequency-axis signal is quantized, and ~~makes~~ entropy coding of the quantized signal is performed.

--12. (Currently Amended) The encoding method as set forth in claim 9, wherein in the provisional-number-of-in-use-bits calculating step, ~~there is divided~~ data in the current frame is

divided into units of coding and ~~determines~~ the provisional number of quantizing steps is determined based on ~~the basis of~~ a scale factor for normalization of the data included in the units of coding.

--13. (Currently Amended) The encoding method as set forth in claim 9, wherein in the inter-channel bit allocation step, ~~there is allocated~~ a part of the total number of allocable bits is allocated as the number of usable bits corresponding to the ratio of the provisional number of in-use bits for each channel with the total provisional number of in-use bits for all the plurality of channels.

--14. (Original) The encoding method as set forth in claim 13, wherein in the inter-channel bit allocation step, there is allocated other than the part of the total number of allocable bits evenly for each channel.

--15. (Original) The encoding method as set forth in claim 13, wherein in the inter-channel bit allocation step, there is made a proportional allocation of other than the part of the total number of allocable bits for each channel correspondingly to a code length in which each digital signal is encoded without being compressed.

--16. (Currently Amended) The encoding method as set forth in claim 9, wherein the digital ~~signal is a~~ signals are digital audio ~~signal~~ signals.

--17. (Currently Amended) A program for allowing a computer to encode[[,]] for compression[[,]] a multi-channel signal including digital signals from a plurality of channels by framing the multi-channel signal, determining [[the]] a number of steps of quantizing data in the frame, and ~~making~~ performing entropy coding of the signals, the program comprising the digital steps of:

calculating a sum of code length in a current frame as a provisional number of in-use bits for each channel of the plurality of channels by ~~making~~ entropy coding of the digital signals based on ~~the basis of the~~ a provisional number of quantizing steps provisionally determined for quantizing the digital signals;

allocating [[the]] a number of bits usable for each channel based on ~~the basis of~~ a ratio of [[the]] a provisional number of in-use bits for each channel with the total provisional number of in-use bits, which is [[the]] a sum of the provisional numbers of in-use bits for all the plurality of channels, and

adjusting the number of in-use bits based on ~~the basis of~~ the number of usable bits allocated to each channel.